

In re: Laurent Benbadis et al.  
Appl. No.: 09/700,687  
Filed: February 14, 2001  
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#### REMARKS

In response to the rejection under 35 U.S.C. §112, first paragraph, applicant submits herewith a statement of satisfying the deposit requirement under 37 C.F.R. § 1.808

With respect to the indefiniteness rejection under 35 U.S.C. §112, second paragraph, Claims 1, 3 and 9 have been amended to address the points raised by the Examiner and to thereby eliminate any issue as to definiteness.

Claims 1-7 and 9-10 have been rejected under 35 U.S.C. §102(b) as being anticipated by Hottinger et al. U.S. Patent No. 5,382,438. Hottinger et al. disclose lac-mutant strains of *L. bulgaricus* having a deletion in the gene encoding  $\beta$ -galactosidase.

On the contrary, the mutants of the claimed invention have no deletion of the gene encoding  $\beta$ -galactosidase, but only a non-sense mutation, i.e. a point mutation introducing a stop codon resulting in a truncated protein, without deletion of the DNA. Thus they are clearly structurally different from the mutants of Hottinger et al.

Further this structural difference is correlated with different properties:

Hottinger et al. disclose 2 types of mutant strains of *L. bulgaricus*.

The mutant strains of the first type (exemplified by CNCM I-1068 are incapable of fermenting lactose (and thus to grow and acidify in milk) on their own. However when they are co-cultured in milk with *S. thermophilus* (i.e. usual conditions of yogurt making), they have acidification properties almost similar to those of the corresponding wild-type strain of *L. bulgaricus*. The acidification rate, as well as the post acidification in storage can be modulated by the addition of small quantities of glucose (column 3, lines 9-16 of Hottinger et al.).

The mutant strains of the second type (exemplified by CNCM I-1067) are also incapable of fermenting lactose on their own. When they are co-cultured in milk with *S. thermophilus*, their capacity of acidification remains low when, and the addition of glucose induces only a slight enhancement of these acidification properties (column 3, lines 17-26).

In contrast, when the mutant strains of the instant application are co-cultured in milk with *S. thermophilus*, they have a low capacity of acidification, and this capacity of acidification rate can efficiently be modulated by glucose.

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The lactic ferments of Claims 4 and 5 include the mutants of Claims 1-3. The method of Claims 6-7 requires the use of these mutants. The fermented dairy products of Claims 4-10 contain the microorganisms used in the fermentation, and in particular, the mutants of Claims 1-3. Thereby, these ferments, methods, and products are different from those described by Hottinger et al.

Claims 6 and 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Hottinger reference in view of Mainzer et al. U.S. Patent No. 5,639,648.

Mainzer et al. disclose conditional mutants of *L. bulgaricus* having a temperature of pH sensitive  $\beta$ -galactosidase activity. They teach a fermentation method using these mutants, wherein fermentation is conducted under permissive conditions for the  $\beta$ -galactosidase, and stopped by inducing non-permissive conditions.

In view of this reaching one of skill in the art would have been motivated to use conditional  $\beta$ -galactosidase mutants for stopping fermentation by switching off the  $\beta$ -galactosidase activity. He would not have been motivated to use mutants of the instant invention that are always devoid of  $\beta$ -galactosidase activity.

Thus, it appears that Mainzer et al. not only do not cure the deficiencies of Hottinger et al., but further teach away from the process of the instant invention.

It is believed that this Response has addressed all outstanding issues raised in the Official Action, and it is believed that this application is now in condition for allowance. Favorable

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reconsideration by the Examiner and formal notification of the allowability of all claims as now presented are earnestly solicited.

Respectfully submitted,



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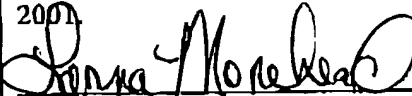
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**Version with Markings to Show Changes Made:**

1. (Amended) A mutant strain of *L. bulgaricus* lacking  $\beta$ -galactosidase activity [, characterized in that it] which carries a non-sense mutation in at least one of the coding sequences of the lactose operon.
2. (Amended) The mutant strain of *L. bulgaricus* as claimed in claim 1, [characterized in that] wherein said coding sequence is the sequence encoding  $\beta$ -galactosidase.
3. (Twice Amended) The mutant strain of *L. bulgaricus* as claimed in claim 1, which was deposited on January 14, 1998 with the CNCM under the number I-1968.
4. (Amended) A lactic ferment, [characterized in that it] which comprises at least one strain of *L. bulgaricus* as claimed in claim 1.
5. (Amended) The lactic ferment as claimed in claim 4, [characterized in that] wherein said strain of *L. bulgaricus* is combined with at least one strain of *S. thermophilus*.
6. (Twice Amended) A method for preparing a fermented dairy product, [characterized in that it] which comprises a step during which milk is fermented using a lactic ferment comprising at least one strain of *L. bulgaricus* as claimed in claim 1, in the presence of at least one sugar which can be assimilate by said strain.
7. (Amended) The method as claimed in claim 6, [characterized in that] wherein said sugar which can be assimilated is glucose.
8. (Twice Amended) The method as claimed in claim 6, [characterized in that] wherein the arrest of fermentation is carried out without cooling of said dairy product.
9. (Twice Amended) A fermented dairy product [which can be] obtained using a method as claimed in claim 6.

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10. (Amended) The fermented dairy product as claimed in claim 9, [characterized in that] wherein said product is a yogurt.

Attorney Docket No. 33339/206076PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No.: 09/700,687  
Filed: February 14, 2001  
For: MUTANT LACTOBACILLUS  
BULGARICUS STRAINS FREE FROM  
BETA-GALACTOSIDE ACTIVITY

Group Art Unit: 1651

Examiner: R. Davis

October 15, 2001

Commissioner for Patents  
Washington, D.C. 20231

**STATEMENT OF SATISFYING THE DEPOSIT REQUIREMENT  
UNDER 37 C.F.R. § 1.808**

Sir:

I hereby state that:

1. The mutant strain of *L. bulgaricus* recited in Claims 3 and 11-18 of the present patent application was deposited with the Collection Nationale de Cultures de Microorganismes (CNCM), 28 rue du Docteur Roux, 75724 Paris, France on 14 January 1998, under accession number I-1968.
2. The above-stated deposit was made under the conditions prescribed by the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure.
3. I also state that subject to the exception under 37 CFR § 1.808(b), all restrictions imposed by the depositor on the availability to the public of the deposited materials will be

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irrevocably removed upon the granting of the patent. I further state that the deposits fully meet the requirements of 37 CFR §§ 1.806-808.

Respectfully submitted,

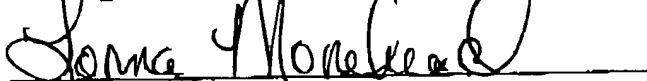


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